

AMENDMENTS TO THE SPECIFICATION

IN THE SPECIFICATION:

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Please amend paragraph number [0032] as indicated below:

[0032] In a nitride semiconductor laser device according to a nineteenth aspect of the present invention, the waveguide region is formed above the luminescent radiation region 112. Specifically, the waveguide region of the semiconductor layer is provided such that the aforementioned high impurity region or low dislocation density region as the luminescent radiation region at least partially overlaps the region in the substrate plane. It is preferable that the luminescent radiation region covers almost the whole waveguide region. In the case where the whole laser construction is has a ridge waveguide structure, in order to be overlapped the stripe-shaped ridge in the substrate plane, it is preferable that the luminescent radiation region with a width wider than the ridge stripe overlaps the ridge. In this case, it is possible to provide efficient luminescent radiation and light conversion of stray light.

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Please amend paragraph number [0050] as indicated below:

[0050] Additionally, in the case where the waveguide region is formed in the nitride semiconductor layer that is grown on the luminescent radiation region, it is possible to provide an excellent waveguide region for laser light. In the case where the luminescent radiation region is formed in the location corresponding to the waveguide region, it is possible to improve the

absorption efficiency of stray light. For this reason, the luminescent radiation region is preferably provided in proximity to the waveguide region. However, too much absorption may cause threshold ~~reduction~~ to increase. In this case, the waveguide region is spaced away from the luminescent radiation region, specifically, the luminescent radiation region and the waveguide region or the ridge stripe are spaced away from each other. Thus, the waveguide region can be formed in a grown nitride semiconductor. The luminescent radiation region is only required to be able to absorb the wavelength of light emitted from the active layer and to emit luminescent radiation. Specifically, the luminescent radiation region is only required to provide high luminescent radiation as compared with a partial region other than the luminescent radiation region. Accordingly, in addition to adjustment of dislocation density or impurity by the aforementioned nitride semiconductor substrate growth method, the luminescent radiation region can be formed by ion implantation, or the like, in the later processes.

(End Surface Protective Film 110)

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[0078] First, a 2-inch different material substrate of sapphire having C-plane as primary surface is set in a MOCVD reactor vessel. A buffer layer of GaN with a thickness of 200 Å is grown thereon at temperature of 500°C by using trimethyl gallium (TMG), and ammonia (NH₃). In addition, a foundation layer of GaN with a thickness of 2.5 μm is grown at temperature of 1000°C or more. After that, it is moved to a HVPE reactor vessel. A nitride semiconductor 4 of GaN with a thickness of 500 μm is grown by using Ga metal, HCl gas and ammonia as materials.

Subsequently, only the sapphire is peeled off by excimer laser irradiation, and a nitride semiconductor with a thickness of 450 μm is formed by performing CMP.

(N-Type Contact Layer)

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Please amend paragraph number [0088] as indicated below:

[0088] Finally, a p-type contact layer of Mg-doped GaN with a thickness of 150 \AA is grown at 1050°C on the p-type cladding layer. The p-type contact layer can be formed of p-type $\text{In}_x\text{Al}_y\text{Ga}_{1-x-y}\text{N}$ (~~$x \leq 0, 0 \leq y \leq 1$~~ $0 \leq x, 0 \leq y, x + y \leq 1$). It is preferably formed of Mg-doped GaN. The reason is that, in this case, the most preferable ohmic contact can be obtained. After reaction, the wafer is annealed at 700°C under a nitrogen atmosphere in a reactor vessel to reduce resistance of the p-type layers.

(Exposure of N-Type Layer)

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Please amend paragraph number [0096] as indicated below:

[0096] Pad Electrodes are formed so as to cover the aforementioned ohmic electrodes. In this case, they are preferably formed so as to overlap the second insulating film. The p-side pad electrode has a lamination structure of Ni/Ti/Au (1000 \AA /1000 \AA /~~800 \AA~~ 8000 \AA) in this order. In addition, the n-side pad electrode is formed of Ni/Ti/Au (1000 \AA /1000 \AA /8000 \AA) from the bottom side in this order. These pad electrodes are in contact with the p-side and n-side ohmic

electrodes along stripe shapes so as to interpose the second insulating film between each pad electrode and each ohmic electrode.

(Cleavage and Resonance Surface Formation)

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Please amend paragraph number [0102] as indicated below:

[0102] In an example 3, a substrate that is obtained as follows is used as a nitride semiconductor substrate. A GaAs substrate is used as a growth substrate. A stripe-shaped protective layer of SiO₂ is formed in ~~parallel~~ perpendicular to the M-plane of a nitride semiconductor on the upper surface of the substrate. A nitride semiconductor is grown by using this as a seed crystal such that the facet surface appears. Thus, a nitride semiconductor substrate 101 with thickness of 300 μm is obtained. The nitride semiconductor substrate obtained as described above is a nitride semiconductor substrate has a stripe-shaped low dislocation density region and a dislocation flux region. A ridge is formed in the upper part of the low dislocation density region 112. The low dislocation density 112 region is a luminescent radiation region. It absorbs light emitted from the active layer (405 nm) when a current is applied, and emits luminescent radiation (560 nm). In the example 3, although the n-electrode 107 is formed on the back surface of the nitride semiconductor substrate, before the ridge formation, etching is performed so as to expose the n-type semiconductor layer 102. Particularly, the n-type semiconductor layer 102 to the p-type semiconductor layer 103 that are formed above the dislocation flux 111 with poor crystallinity has a growth condition different from its periphery. Accordingly, its thickness is small as compared with the periphery. It is considered that such a region does not have sufficient pn

junction formation. For this reason, the n-type semiconductor layer to the p-type semiconductor layer in the region that has a width slightly wider than the strip-shaped dislocation flux is removed by etching, thus, it is possible to reduce deterioration of the device performance. Except for a process where a third end surface protective film composed of two pairs (Al_2O_3 (823 Å)/ TiO_2 (509 Å)) is provided on the emission-side end surface, processes are performed similarly to the example 1, thus, a nitride semiconductor laser device according to the present invention is obtained. In addition, in the example 3, similarly to the example 1, in the case where the wavelength of light emitted from the active layer is 400 nm, and the wavelength of luminescent radiation that is emitted by absorption of the wavelength of the light emitted from the active layer is 550 nm, as for the wavelengths (λ), these thicknesses in the third end surface protective film are set to $\lambda/4n$ (where n is the refractive index). The laser device obtained as described above can be driven into continuous wave with wavelength of 405 nm and high power of 60 mW, at a room temperature and a threshold current density of 2.5 kA/cm². Since irradiation of the luminescent radiation on a detector provided on the rear side, precise controlled driving can be provided. Additionally, the laser light emitted from the emission side end surface has less noise (unevenness), and has excellent FFP.